Course Description Form

1. Course Name:
Soil Mineralogy
2. Course Code:
SOMI356
3. Semester / Year:
The Second Spring Semester
4. Description Preparation Date:
2024/2/1
5. Available Attendance Forms:
My Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2 theortical +3 prtical /3.5 units
7. Course administrator's name (mention all, if more than one name)
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8. Course Objectives
• The learner should be able to understand and understand the relationship between the crystal and its systems and axes. **• Enable the student to know the structural composition of silicate minerals** **• Enabling the student to understand and know the most important structural properties of minerals** **• Identify the transformations that occur in clay minerals** **• Enable the student to become familiar with the most important methods for detecting and distinguishing clay minerals and the special parameters for diagnosing soil minerals.** **• Enable the student to identify the crystalline structure of minerals** **• Identifying the surface charges of clay separations** **• Measurement of variable and fixed charges on clay surfaces**
9. Teaching and Learning Strategies
- Interactive lecture - Brainstorming - Dialogue and discussion - Field Training - Practical exercises - Field project - Self-education
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2Theoretical	A1: The student learns abou the most important rocks th make up the Earth's crust B1: The student distinguish between types of rocks (igneous, sedimentary, metamorphic) B2: The student distinguish between chemical and physical weathering	Theoretical: Mineral compositic of the Earth's crust	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam
	3practical	C7: The student collects different soil samples C8: Grinds and sieves soil samples C9: Prepares soil samples f mineral analysis	practical : Preparing soil samples For civil analysis	practical : Interactive lecture, brainstormin dialogue discussion, f training, practical exercises, self-learning	practical : Short practical test
2	2Theoretical	A2: The student identifies t main parts of the crystal C1: The student describes t crystal axes with a diagram	Theoretical: Crystal structure of minerals	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam

	3practical	C10: The student uses the siphon method to separate clay from other materials	practical : Clay separation	practical : Interactive lecture, brainstormin dialogue discussion, f training, practical exercises, self-learning	practical : Short practical test
3	2Theoretical	A3: The student differentiat between crystalline systems by the number of faces, axi length, and interfacial angle A4: The learner distinguish between the cubic, hexagon triangular, monoclinic, and triangular systems.	Theoretical: Crystal systems	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam
	3practical	C11: The learner uses distil water to wash the soil of sa	practical : Removal of dissolv salts	practical : Interactive lecture, brainstormin dialogue discussion, f training, practical exercises, self-learning	practical : Short practical test
4	2Theoretical	B3: The student employs th relationship between the arrangement of atoms that make up a metal crystal A4: It determines the type c joint, strength and hardness the metal	Theoretical: Structural composition of minerals	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam

	3practical	C12: The student removes carbonate minerals using H A12: The learner uses a hydrogen peroxide solution remove organic matter	practical : Removal of calciur carbonate And organic matte	practical : Interactive lecture, brainstormin dialogue discussion, f training, practical exercises, self-learning	practical : Short practical test
5	2Theoretical	A5: The student is familiar with the most important rul that control the distribution ions in the minerals of the Earth's crust B4: The student distinguish silicate minerals based on t type of structural unit	Theoretical: Structural structure silicate minerals	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam
	3practical	C13: The student uses DCB remove iron oxides from cl separators	practical : Removal of iron oxides	practical : Interactive lecture, brainstormin dialogue discussion, f training, practical exercises, self-learning	practical : Short practical test
6	2Theoretical	B5: The student judges the type of clay mineral from t soil separation B6: The student distinguish primary from secondary minerals by their resistance weathering	Theoretical: Soil minerals	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam

	3practical	B11: The student examines clay slices with an X-Ray machine	practical : Preparing clay strip for a purpose Examination	practical : Interactive lecture, brainstormin dialogue discussion, fi training, practical exercises, self-learning	practical : Short practical test
7	2Theoretical	A6: The student differentiat between silicate minerals by the number of tetrahedral ar octahedral units	Theoretical: Silicate minerals	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam
	3practical	A13: The student uses X-ra diffraction technology in mineral analysis	practical : Mineralogical analysis of clay	practical : Interactive lecture, brainstormin dialogue discussion, fi training, practical exercises, self-learning	practical : Short practical test
8	2Theoretical	B7: The student distinguish silicate minerals from non-silicate minerals through silicon dioxide	Theoretical: Non-silicate miner	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam

	3practical	A14: Clay minerals are classified through magnesiu impregnation and air drying A15: Clay minerals are classified through treatment by saturation with magnesiu and treatment with ethylene glycol A16: Clay minerals are classified through treatment by saturation with potassiur and air drying A17: Clay minerals are classified during treatment saturation with potassium a heating at 350°C. A18: Clay minerals are classified during treatment saturation with potassium a heating at 550°C. A19: The student determine the type and percentage of clay minerals in the soil sample	practical : Practical applicatio for diagnosis Calculating the proportions of clay minerals	practical : Interactive lecture, brainstormin dialogue discussion, f training, practical exercises, self-learning	practical : Short practical test
9	2Theoretical	A7: The student is aware of the importance of clay minerals C2: The student judges the structural composition by th number of tetrahedral and octahedral units	Theoretical: Clay minerals	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam
	3practical	A20: The student uses the washing and sedimentation method to separate sand A21: The learner uses an optical microscope to view crystals of different colors a sizes.	practical : Sand separation	practical : Interactive lecture, brainstormin dialogue discussion, f training, practical exercises, self-learning	practical : Short practical test

10	2Theoretical	A8: The student classifies c minerals into crystalline and amorphous B8: The student distinguish expanded clay minerals by crystal dimension of 18 enkstrom	Theoretical: Division of clay minerals	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam
	3practical	A16: The student uses bromoform to separate coar sand from fine sand	practical : Separation of sand minerals Light to heavy	practical : Interactive lecture, brainstormin dialogue discussion, fi training, practical exercises, self-learning	practical : Short practical test
11	2Theoretical	A9: The student classifies kaolinite minerals as non-expanding minerals C3: The student distinguish kaolinite minerals by 7-inkstrom reflectance	Theoretical: Clay minerals 1:1	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam
	3practical	C14: The student uses Cana Balsam to stabilize sand grains	practical : Preparing sand slic For analysis	practical : Interactive lecture, brainstormin dialogue discussion, fi training, practical exercises, self-learning	practical : Short practical test

12	2Theoretical	A10: The student classifies smectite minerals as expanc minerals C4: The student distinguish smectite minerals by 14-inkstrom reflectance	Theoretical: Clay minerals 1:2(expanded)	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam
	3practical	A22: The student learns abc the type of charges through delamination curves	practical : Estimating standin shipments For soil	practical : Interactive lecture, brainstormin dialogue discussion, f training, practical exercises, self-learning	practical : Short practical test
13	2Theoretical	C5: Mica appears as a hexagonal shape under an electron microscope C6: The student distinguish mica minerals by their lamellar structure	Theoretical: Clay minerals 1:2 (unexpanded)	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam
	3practical	A23: The student distinguishes variable charg from permanent charges by the degree of interaction of medium	practical : Estimating variable charges For soil	practical : Interactive lecture, brainstormin dialogue discussion, f training, practical exercises, self-learning	practical : Short practical test

14	2Theoretical	A11: The student recognize the mineral chlorite in the presence of the brucite laye B9: The student distinguish the mineral chlorite by constant reflection in all parameters at 14 enkstrom	Theoretical: Clay minerals 1:1:2	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam
	3practical	B13: The student examines iron oxides extracted using chelating materials	practical : Determination of ir oxides College in the soil	practical : Interactive lecture, brainstormin dialogue discussion, fi training, practical exercises, self-learning	practical : Short practical test
15	2Theoretical	B10: The student judges the transformation of clay minerals by hydrothermal reactions and weathering	Theoretical: Clay mineral transformations	Interactive lecture, brainstormin dialogue discussion, s learning	Theoretical: Semester exam 1, final exam
	3practical	A24: The student uses an X device to examine crystallir iron oxides	practical : Determination of ir oxides Crystallized in soil	practical : Interactive lecture, brainstormin dialogue discussion, fi training, practical exercises, self-learning	practical : Short practical test

11. Course Evaluation

	Calendar methods	Calendar date (week)	degree	Relative weight %
1	Report 1	fourth week	brother	2.5
2	Report 2	The fifth week	brother	2.5
3	Short test (1) Quiz	the sixth week	a	2
4	Short test (2) Quiz	The fourteenth week	a	2
5	Short test (3) Quiz	The fifteenth week	1	1
6	Semester test (1)	the sixth week	H.K	7.5
7	Semester test (2)	The eleventh week is difficult	H.K	7.5
8	Final theoretical test	Final semester exams	40	40
9	Practical field project	The fifteenth week	Kh	5
10	Field evaluation	The third and fifth week	a	2
11	Practical short test (1) Quiz	The first week	1	1
12	Short practical test (2) Quiz	fourth week	0.kh	0.5
13	Short practical test (3) Quiz	The fourteenth week	1	1
14	Live drawings and homework	Weeks 6, 8, 9, 10, 11, 12 and 13	Kh.kh	5.5
15	Final practical test	Final semester exams	20	20
	total	100	100%	%100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Soil Chemistry book, written Dr. Kazem Mashhout 1986
Main references (sources)	

Recommended books and references (scientific journals, reports…)	The book (Soil Minerals) writt by Prof. Dr. Salman is behind Iss
Electronic References, Websites	

dr.Abd Alkader Absh Sbak — Theoretical subject teacher

Ahmed Samir Ghanem — Practical subject teacher

dr.Abd Alkader Absh Sbak — Chairman of Scientific Committee

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